

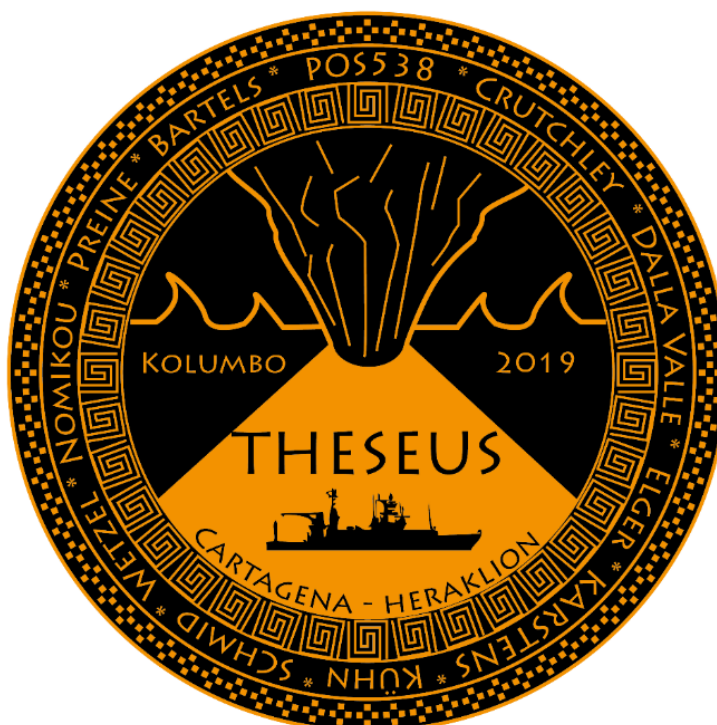
Dr. Jens Karstens  
GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel  
Wischhofstr. 1-3  
24148 Kiel  
Germany

Phone: +49 431 600-2660  
Fax: +49 431 600-2922  
Email: [jkarstens@geomar.de](mailto:jkarstens@geomar.de)

**Short Cruise Report  
R/V Poseidon – POS538**

**7th October – 28th October, 2019  
Cartagena (Spain) - Heraklion (Greece)**

**Chief scientist: Dr. Jens Karstens  
Captain: Matthias Günther**



20.04.2020

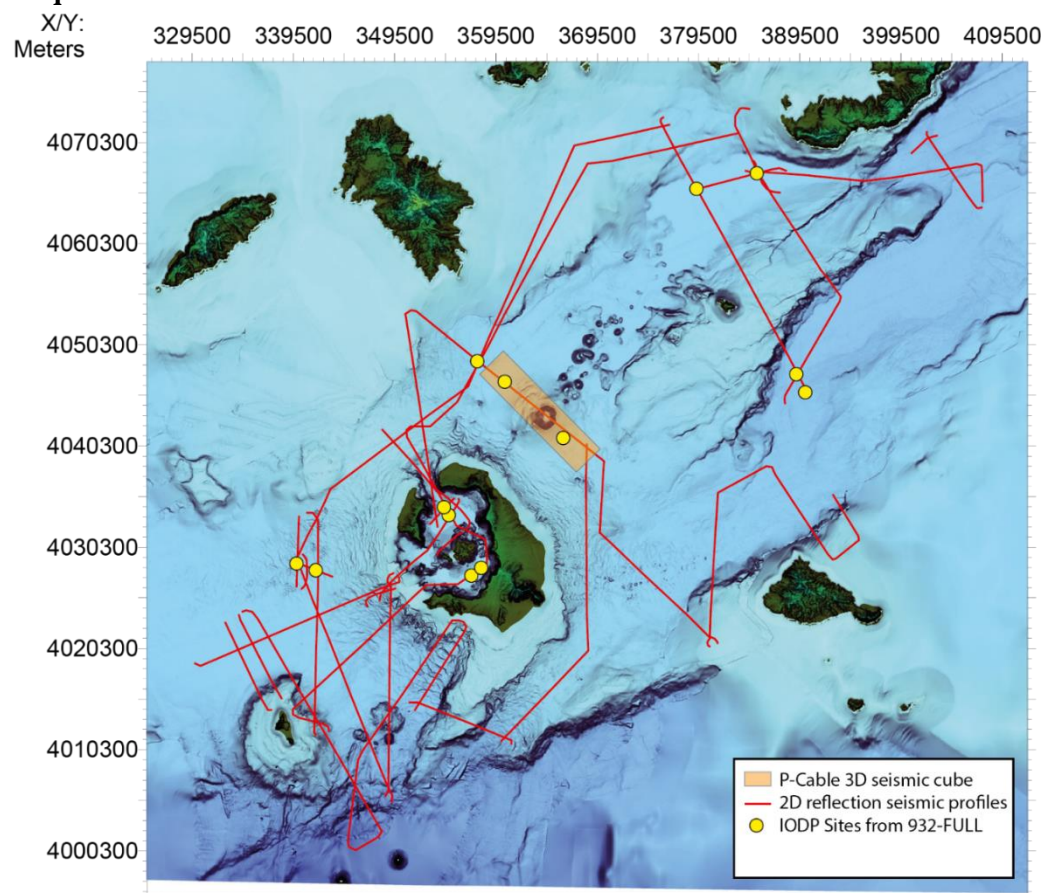
GEOMAR Helmholtz Centre for Ocean Research Kiel

### Motivation and objectives

The main goal of the cruise was to gain a better understanding of the geological processes controlling tsunami genesis during submarine volcanogenic eruptions. The 1650 Kolumbo eruption is an excellent target, because it is possible to determine the most important parameters of different tsunami source mechanisms. These include the volumes of pyroclastic density currents and potential secondary slides as well as the number and depth of crater-forming eruptions. Furthermore, it is possible to constrain the entire growth and destruction cycle of a submarine volcanic cone and to compare this with historic eyewitness accounts. The shallow seismicity beneath the Kolumbo volcano highlights the importance of gaining a better understanding of one of Europe's most hazardous submarine volcanoes. The expected results of our experiments have not only relevance for geohazard assessment in the Aegean Sea, but will provide valuable information for the understanding of past tsunamigenic eruptions at other volcanoes like Krakatau. The cruise had three objectives:

- 1) The first aim of the cruise was to determine if the youngest stratigraphic subunit of the volcanic cone has been formed during a single eruption in 1650.
- 2) The second aim of the cruise was to test the plausibility of different tsunami source mechanisms for the 1650 Kolumbo eruption.
- 3) The third aim of this cruise was to acquire site survey data for the IODP proposal "Volcanic, tectonic and hydrothermal processes in an island-arc caldera environment (932-FULL)".

### Acquired datasets



## Narrative

The cruise started on Monday, 7th of October 2019 at 8:30 from Cartagena and R/V Poseidon headed towards the research area in the eastern Mediterranean. We arrived in the working area on the 13th of October at 11:00 and began our scientific program with a releaser test for our ocean bottom seismometers (OBS). At 14:00, we deployed a streamer with a 200 m long active section and the airgun and began acquiring 2D seismic profiles west of Santorini, within the Santorini Caldera and between Santorini and Amargos. At 10:00 of the 14th of October, we recovered the streamer and the airgun to deploy six OBS at Kolumbo. Afterwards we started acquiring 2D seismic data using a streamer with a 50 m long active section at 18:45. At 12:15 of the 15th of October we started with deployment of the P-Cable system, which took until 16:00, when we started acquiring data. We were able to keep the P-Cable system in the water for 7 days without any technical problems except one and a half malfunctioning streamer sections. From the 15th until the 20th of October, weather and sea conditions were very favorable for seismic acquisition. Afterwards the wind picked up and increased during the 21st of October and we had stop surveying at 22:30, but could keep the seismic equipment in the water by turning the ship into the wind. In the morning of the 22nd of October, we continued our 3D seismic survey and finalized acquiring the planned 3D seismic dataset at 14:45 and recovered the airgun and the P-Cable system. On the 23rd of October, we reequipped for 2D seismic acquisition and started a new survey at 11:00. We continued acquiring 2D seismic profiles in the Christiana Basin west of Santorini and in the Amorgos Basin northeast of Santorini on the 24th and the 25th of October. The weather conditions were good for 2D seismic data during that period, but became worse during the 25th of October. On the morning of the 26th of October, we reequipped the airgun to shoot a refractions seismic profiles over the OBS, which took from 10:15 to 11:30. Afterwards we recovered all six OBS from 14:00 to 17:00. In the morning of the 27th of October, we deployed a 2D seismic streamer with a 75 m long active section at 8:30 and started acquiring seismic profiles in the Anafi Basin west of Santorini. We recovered the streamer and the airgun at 17:45 and began our transit to Heraklion, where the cruise ended.

## List of participants

| Name                   | Task                                  | Institute                   |
|------------------------|---------------------------------------|-----------------------------|
| Dr. Jens Karstens      | Chief Scientist, seismic acquisition  | GEOMAR                      |
| Gareth James Crutchley | Senior scientist, seismic processing  | GEOMAR                      |
| Dr. Florian Schmid     | Senior scientist, OBS seismics        | GEOMAR                      |
| Dr. Judith Elger       | Senior scientist, seismic processing  | GEOMAR                      |
| Michel Kühn            | Master student, seismic processing    | GEOMAR / University of Kiel |
| Dr. Paraskevi Nomikou  | Senior scientist, seismic acquisition | University of Athens        |
| Jonas Preine           | Master student, seismic processing    | University of Hamburg       |
| Giacomo Dalla Valle    | Senior scientist, seismic acquisition | CNR-ISMAR (Bologna)         |
| Thies Bartels          | Technician                            | GEOMAR                      |
| Gero Wetzell           | Technician                            | GEOMAR                      |

## Acknowledgements

We would like to thank Captain Matthias Günther and the entire crew of R/V Poseidon for their excellent support and hospitality during the entire cruise. The conducted experiments were very successful and we feel sad that POS538 was our last cruise onboard R/V Poseidon. We would like to thank the GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel for the technical and financial support of this cruise and the Alfred-Wegener-Institute in Bremerhaven for providing us their compressor container for our campaign.

## Institutes

GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel  
Wischhofstr. 1-3, 24148 Kiel, Germany

University of Athens  
Department of Geology and Geoenvironment  
Panepistimioupoli Zografou, 15784, Athens, Greece

University of Hamburg  
Institute of Geophysics  
Bundesstraße 55, 20146 Hamburg, Germany

Institute of Marine Sciences - National Research Council (ISMAR-CNR)  
Via Gobetti 101, 40129 Bologna, Italy

### Station List

| Leg    | Eventlabel | Eventname | Time [UTC]                       | Latitude | Longitude |
|--------|------------|-----------|----------------------------------|----------|-----------|
| POS538 |            | 1-1       | 2019-10-13<br>09:02: <b>12.0</b> | 36,2984  | 25,25831  |
| POS538 |            | 1-1       | 2019-10-13<br>09:10:34.0         | 36,29873 | 25,25917  |
| POS538 |            | 1-1       | 2019-10-13<br>09: <b>35:05.0</b> | 36,29934 | 25,26116  |
| POS538 |            | 2-1       | 2019-10-13<br><b>12:06:33.0</b>  | 36,32907 | 25,2749   |
| POS538 |            | 2-1       | 2019-10-13<br>12:32: <b>02.0</b> | 36,33771 | 25,27204  |
| POS538 |            | 2-1       | 2019-10-13<br><b>13:09:53.0</b>  | 36,35196 | 25,26675  |
| POS538 |            | 2-1       | 2019-10-13<br><b>13:32:08.0</b>  | 36,37579 | 25,2575   |
| POS538 |            | 2-1       | 2019-10-13<br><b>13:39:10.0</b>  | 36,71309 | -4,42198  |
| POS538 |            | 2-1       | 2019-10-13<br><b>14:10:32.0</b>  | 36,39123 | 25,20906  |
| POS538 |            | 2-1       | 2019-10-13<br><b>15:56:45.0</b>  | 36,4304  | 25,21416  |
| POS538 |            | 2-1       | 2019-10-13<br><b>19:05:43.0</b>  | 36,24159 | 25,2352   |
| POS538 |            | 2-1       | 2019-10-13<br><b>19:54:39.0</b>  | 36,2534  | 25,21555  |
| POS538 |            | 2-1       | 2019-10-13<br><b>22:24:31.0</b>  | 36,37095 | 25,35313  |
| POS538 |            | 2-1       | 2019-10-13<br><b>22:53:10.0</b>  | 36,37459 | 25,39053  |
| POS538 |            | 2-1       | 2019-10-13<br><b>23:18:40.0</b>  | 36,71309 | -4,42198  |
| POS538 |            | 2-1       | 2019-10-13<br><b>23:38:22.0</b>  | 36,71309 | -4,42198  |
| POS538 |            | 2-1       | 2019-10-14<br><b>00:05:29.0</b>  | 36,42543 | 25,38919  |
| POS538 |            | 2-1       | 2019-10-14<br><b>01:28:34.0</b>  | 36,50424 | 25,33213  |

|        |  |     |                                  |          |          |
|--------|--|-----|----------------------------------|----------|----------|
| POS538 |  | 2-1 | 2019-10-14<br><b>02:25:31.0</b>  | 36,53875 | 25,38705 |
| POS538 |  | 2-1 | 2019-10-14<br><b>05:56:56.0</b>  | 36,74813 | 25,52404 |
| POS538 |  | 2-1 | 2019-10-14<br>08: <b>07:45.0</b> | 36,78024 | 25,69569 |
| POS538 |  | 2-1 | 2019-10-14<br>08: <b>15:38.0</b> | 36,78391 | 25,70071 |
| POS538 |  | 2-1 | 2019-10-14<br>09:05: <b>48.0</b> | 36,79375 | 25,70555 |
| POS538 |  | 2-1 | 2019-10-14<br><b>09:08:46.0</b>  | 36,79609 | 25,70646 |
| POS538 |  | 2-1 | 2019-10-14<br><b>10:31:28.0</b>  | 36,71309 | -4,42198 |
| POS538 |  | 2-1 | 2019-10-14<br><b>12:18:35.0</b>  | 36,71309 | -4,42198 |
| POS538 |  | 2-1 | 2019-10-14<br>12: <b>28:20.0</b> | 36,73198 | 25,64028 |
| POS538 |  | 2-1 | 2019-10-14<br>12: <b>44:49.0</b> | 36,73776 | 25,645   |
| POS538 |  | 3-1 | 2019-10-14<br>14: <b>22:49.0</b> | 36,57313 | 25,40909 |
| POS538 |  | 4-1 | 2019-10-14<br>14: <b>46:18.0</b> | 36,55509 | 25,43968 |
| POS538 |  | 5-1 | 2019-10-14<br>15: <b>04:12.0</b> | 36,54695 | 25,4716  |
| POS538 |  | 6-1 | 2019-10-14<br>15: <b>21:30.0</b> | 36,53557 | 25,45587 |
| POS538 |  | 7-1 | 2019-10-14<br>15: <b>45:13.0</b> | 36,52332 | 25,4873  |
| POS538 |  | 8-1 | 2019-10-14<br>16: <b>00:49.0</b> | 36,5075  | 25,50416 |
| POS538 |  | 9-1 | 2019-10-14<br><b>16:31:48.0</b>  | 36,47246 | 25,53719 |
| POS538 |  | 9-1 | 2019-10-14<br>16:39: <b>42.0</b> | 36,47442 | 25,53949 |
| POS538 |  | 9-1 | 2019-10-14<br>16: <b>58:01.0</b> | 36,48845 | 25,54463 |
| POS538 |  | 9-1 | 2019-10-14<br><b>20:07:24.0</b>  | 36,61529 | 25,34062 |
| POS538 |  | 9-1 | 2019-10-14<br><b>23:17:32.0</b>  | 36,43034 | 25,36572 |
| POS538 |  | 9-1 | 2019-10-15<br><b>00:00:17.0</b>  | 36,71309 | -4,42198 |
| POS538 |  | 9-1 | 2019-10-15<br><b>00:51:15.0</b>  | 36,40671 | 25,35913 |
| POS538 |  | 9-1 | 2019-10-15<br><b>01:45:48.0</b>  | 36,36504 | 25,30515 |
| POS538 |  | 9-1 | 2019-10-15<br><b>03:12:13.0</b>  | 36,37883 | 25,36583 |
| POS538 |  | 9-1 | 2019-10-15<br><b>04:07:36.0</b>  | 36,42377 | 25,39923 |

|        |  |      |                                  |          |          |
|--------|--|------|----------------------------------|----------|----------|
| POS538 |  | 9-1  | 2019-10-15<br>05: <b>50:08.0</b> | 36,50475 | 25,31076 |
| POS538 |  | 9-1  | 2019-10-15<br>06: <b>30:35.0</b> | 36,51494 | 25,29862 |
| POS538 |  | 9-1  | 2019-10-15<br>06: <b>37:12.0</b> | 36,51661 | 25,29728 |
| POS538 |  | 10-1 | 2019-10-15<br><b>10:27:06.0</b>  | 36,40264 | 25,56986 |
| POS538 |  | 10-1 | 2019-10-15<br><b>11:37:38.0</b>  | 36,4236  | 25,5551  |
| POS538 |  | 10-1 | 2019-10-15<br><b>12:02:42.0</b>  | 36,43791 | 25,55181 |
| POS538 |  | 10-1 | 2019-10-15<br><b>13:48:57.0</b>  | 36,44756 | 25,56305 |
| POS538 |  | 10-1 | 2019-10-15<br>14: <b>44:34.0</b> | 36,48255 | 25,51474 |
| POS538 |  | 10-1 | 2019-10-15<br>16: <b>40:37.0</b> | 36,56127 | 25,41385 |
| POS538 |  | 10-1 | 2019-10-15<br>17: <b>06:31.0</b> | 36,57102 | 25,42642 |
| POS538 |  | 10-1 | 2019-10-15<br>19: <b>00:45.0</b> | 36,49249 | 25,52717 |
| POS538 |  | 10-1 | 2019-10-15<br>19: <b>24:01.0</b> | 36,4831  | 25,51489 |
| POS538 |  | 10-1 | 2019-10-15<br>21: <b>32:29.0</b> | 36,56154 | 25,41436 |
| POS538 |  | 10-1 | 2019-10-15<br>22: <b>01:53.0</b> | 36,5712  | 25,42698 |
| POS538 |  | 10-1 | 2019-10-16<br>00: <b>10:44.0</b> | 36,49223 | 25,52824 |
| POS538 |  | 10-1 | 2019-10-16<br>00: <b>33:12.0</b> | 36,48333 | 25,51561 |
| POS538 |  | 10-1 | 2019-10-16<br>02: <b>35:21.0</b> | 36,5618  | 25,41513 |
| POS538 |  | 10-1 | 2019-10-16<br>03: <b>02:20.0</b> | 36,57266 | 25,42535 |
| POS538 |  | 10-1 | 2019-10-16<br>05: <b>17:12.0</b> | 36,493   | 25,52814 |
| POS538 |  | 10-1 | 2019-10-16<br>05: <b>45:18.0</b> | 36,48357 | 25,51609 |
| POS538 |  | 10-1 | 2019-10-16<br>07: <b>51:32.0</b> | 36,56264 | 25,41502 |
| POS538 |  | 10-1 | 2019-10-16<br>08: <b>19:47.0</b> | 36,57191 | 25,42771 |
| POS538 |  | 10-1 | 2019-10-16<br>10: <b>28:56.0</b> | 36,49296 | 25,52898 |
| POS538 |  | 10-1 | 2019-10-16<br>10: <b>52:05.0</b> | 36,48386 | 25,51672 |
| POS538 |  | 10-1 | 2019-10-16<br>12: <b>53:35.0</b> | 36,56313 | 25,41519 |
| POS538 |  | 10-1 | 2019-10-16<br>13: <b>19:47.0</b> | 36,57242 | 25,42814 |

|        |  |      |                                  |          |          |
|--------|--|------|----------------------------------|----------|----------|
| POS538 |  | 10-1 | 2019-10-16<br>15: <b>37:37.0</b> | 36,49341 | 25,52937 |
| POS538 |  | 10-1 | 2019-10-16<br>16: <b>00:47.0</b> | 36,48383 | 25,51741 |
| POS538 |  | 10-1 | 2019-10-16<br>17: <b>58:49.0</b> | 36,56269 | 25,41703 |
| POS538 |  | 10-1 | 2019-10-16<br>18: <b>26:51.0</b> | 36,57254 | 25,42875 |
| POS538 |  | 10-1 | 2019-10-16<br>20: <b>29:08.0</b> | 36,49431 | 25,52934 |
| POS538 |  | 10-1 | 2019-10-16<br>20: <b>57:42.0</b> | 36,48488 | 25,51709 |
| POS538 |  | 10-1 | 2019-10-16<br>23: <b>07:55.0</b> | 36,56372 | 25,41628 |
| POS538 |  | 10-1 | 2019-10-16<br>23: <b>35:32.0</b> | 36,57341 | 25,42898 |
| POS538 |  | 10-1 | 2019-10-17<br>01: <b>44:40.0</b> | 36,49425 | 25,53011 |
| POS538 |  | 10-1 | 2019-10-17<br>02: <b>04:19.0</b> | 36,71309 | -4,42198 |
| POS538 |  | 10-1 | 2019-10-17<br>04: <b>10:37.0</b> | 36,56358 | 25,41705 |
| POS538 |  | 10-1 | 2019-10-17<br>04: <b>37:36.0</b> | 36,57377 | 25,42906 |
| POS538 |  | 10-1 | 2019-10-17<br>06: <b>45:58.0</b> | 36,49485 | 25,53011 |
| POS538 |  | 10-1 | 2019-10-17<br>07: <b>09:52.0</b> | 36,48556 | 25,51778 |
| POS538 |  | 10-1 | 2019-10-17<br>09: <b>10:44.0</b> | 36,56429 | 25,41733 |
| POS538 |  | 10-1 | 2019-10-17<br>09: <b>38:15.0</b> | 36,57371 | 25,42997 |
| POS538 |  | 10-1 | 2019-10-17<br>11: <b>44:46.0</b> | 36,49486 | 25,53092 |
| POS538 |  | 10-1 | 2019-10-17<br>12: <b>08:55.0</b> | 36,4858  | 25,51862 |
| POS538 |  | 10-1 | 2019-10-17<br>14: <b>10:38.0</b> | 36,56421 | 25,41839 |
| POS538 |  | 10-1 | 2019-10-17<br>14: <b>38:19.0</b> | 36,57404 | 25,43053 |
| POS538 |  | 10-1 | 2019-10-17<br>16: <b>49:08.0</b> | 36,4956  | 25,5309  |
| POS538 |  | 10-1 | 2019-10-17<br>17: <b>11:31.0</b> | 36,48623 | 25,51915 |
| POS538 |  | 10-1 | 2019-10-17<br>19: <b>11:16.0</b> | 36,56481 | 25,41842 |
| POS538 |  | 10-1 | 2019-10-17<br>19: <b>38:49.0</b> | 36,57423 | 25,43102 |
| POS538 |  | 10-1 | 2019-10-17<br>21: <b>39:20.0</b> | 36,49597 | 25,53136 |
| POS538 |  | 10-1 | 2019-10-17<br>22: <b>02:58.0</b> | 36,48652 | 25,51929 |

|        |  |      |                                  |          |          |
|--------|--|------|----------------------------------|----------|----------|
| POS538 |  | 10-1 | 2019-10-18<br>00: <b>11:07.0</b> | 36,56528 | 25,41869 |
| POS538 |  | 10-1 | 2019-10-18<br>00: <b>40:18.0</b> | 36,57506 | 25,43109 |
| POS538 |  | 10-1 | 2019-10-18<br>02: <b>48:36.0</b> | 36,49632 | 25,53159 |
| POS538 |  | 10-1 | 2019-10-18<br>03: <b>14:40.0</b> | 36,48669 | 25,51873 |
| POS538 |  | 10-1 | 2019-10-18<br>05: <b>20:10.0</b> | 36,56555 | 25,41933 |
| POS538 |  | 10-1 | 2019-10-18<br>05: <b>47:08.0</b> | 36,57445 | 25,43254 |
| POS538 |  | 10-1 | 2019-10-18<br>07: <b>53:32.0</b> | 36,49652 | 25,53231 |
| POS538 |  | 10-1 | 2019-10-18<br>08: <b>26:00.0</b> | 36,48736 | 25,5198  |
| POS538 |  | 10-1 | 2019-10-18<br>10: <b>30:38.0</b> | 36,56601 | 25,41955 |
| POS538 |  | 10-1 | 2019-10-18<br>10: <b>58:02.0</b> | 36,71309 | -4,42198 |
| POS538 |  | 10-1 | 2019-10-18<br>12: <b>56:30.0</b> | 36,49696 | 25,53275 |
| POS538 |  | 10-1 | 2019-10-18<br>13: <b>18:20.0</b> | 36,48744 | 25,52086 |
| POS538 |  | 10-1 | 2019-10-18<br>15: <b>26:37.0</b> | 36,56544 | 25,42116 |
| POS538 |  | 10-1 | 2019-10-18<br>15: <b>57:08.0</b> | 36,57472 | 25,43398 |
| POS538 |  | 10-1 | 2019-10-18<br>17: <b>50:36.0</b> | 36,49745 | 25,53301 |
| POS538 |  | 10-1 | 2019-10-18<br>18: <b>16:26.0</b> | 36,48795 | 25,52083 |
| POS538 |  | 10-1 | 2019-10-18<br>20: <b>26:32.0</b> | 36,56647 | 25,42052 |
| POS538 |  | 10-1 | 2019-10-18<br>20: <b>52:30.0</b> | 36,57615 | 25,43319 |
| POS538 |  | 10-1 | 2019-10-18<br>22: <b>50:47.0</b> | 36,4978  | 25,53329 |
| POS538 |  | 10-1 | 2019-10-18<br>23: <b>15:29.0</b> | 36,48815 | 25,52131 |
| POS538 |  | 10-1 | 2019-10-19<br>01: <b>23:41.0</b> | 36,56701 | 25,42085 |
| POS538 |  | 10-1 | 2019-10-19<br>01: <b>50:24.0</b> | 36,57654 | 25,43369 |
| POS538 |  | 10-1 | 2019-10-19<br>03: <b>50:08.0</b> | 36,49809 | 25,53387 |
| POS538 |  | 10-1 | 2019-10-19<br>04: <b>13:15.0</b> | 36,48774 | 25,52302 |
| POS538 |  | 10-1 | 2019-10-19<br>06: <b>24:50.0</b> | 36,56728 | 25,42148 |
| POS538 |  | 10-1 | 2019-10-19<br>06: <b>50:59.0</b> | 36,57687 | 25,43407 |



|        |  |      |                                  |          |          |
|--------|--|------|----------------------------------|----------|----------|
| POS538 |  | 10-1 | 2019-10-19<br>08: <b>46:13.0</b> | 36,49829 | 25,53453 |
| POS538 |  | 10-1 | 2019-10-19<br>09: <b>11:19.0</b> | 36,48913 | 25,52215 |
| POS538 |  | 10-1 | 2019-10-19<br>11: <b>21:20.0</b> | 36,56739 | 25,42221 |
| POS538 |  | 10-1 | 2019-10-19<br>11: <b>48:08.0</b> | 36,71309 | -4,42198 |
| POS538 |  | 10-1 | 2019-10-19<br>13: <b>44:47.0</b> | 36,49895 | 25,53454 |
| POS538 |  | 10-1 | 2019-10-19<br>14: <b>08:46.0</b> | 36,48867 | 25,52405 |
| POS538 |  | 10-1 | 2019-10-19<br>16: <b>26:45.0</b> | 36,56805 | 25,42228 |
| POS538 |  | 10-1 | 2019-10-19<br>16: <b>50:41.0</b> | 36,57792 | 25,43423 |
| POS538 |  | 10-1 | 2019-10-19<br>18: <b>47:25.0</b> | 36,49935 | 25,53539 |
| POS538 |  | 10-1 | 2019-10-19<br>19: <b>12:27.0</b> | 36,4898  | 25,52288 |
| POS538 |  | 10-1 | 2019-10-19<br>21: <b>35:12.0</b> | 36,56826 | 25,42262 |
| POS538 |  | 10-1 | 2019-10-19<br>22: <b>01:27.0</b> | 36,57782 | 25,43547 |
| POS538 |  | 10-1 | 2019-10-19<br>23: <b>57:07.0</b> | 36,49971 | 25,53532 |
| POS538 |  | 10-1 | 2019-10-20<br>00: <b>23:41.0</b> | 36,49016 | 25,52326 |
| POS538 |  | 10-1 | 2019-10-20<br>02: <b>52:42.0</b> | 36,56863 | 25,42329 |
| POS538 |  | 10-1 | 2019-10-20<br>03: <b>17:04.0</b> | 36,57847 | 25,43535 |
| POS538 |  | 10-1 | 2019-10-20<br>05: <b>09:30.0</b> | 36,50009 | 25,5358  |
| POS538 |  | 10-1 | 2019-10-20<br>05: <b>35:26.0</b> | 36,49022 | 25,52443 |
| POS538 |  | 10-1 | 2019-10-20<br>08: <b>13:57.0</b> | 36,56887 | 25,42349 |
| POS538 |  | 10-1 | 2019-10-20<br>08: <b>46:03.0</b> | 36,57812 | 25,43629 |
| POS538 |  | 10-1 | 2019-10-20<br>10: <b>46:27.0</b> | 36,50088 | 25,53573 |
| POS538 |  | 10-1 | 2019-10-20<br>11: <b>12:35.0</b> | 36,4907  | 25,52423 |
| POS538 |  | 10-1 | 2019-10-20<br>13: <b>18:35.0</b> | 36,56919 | 25,42406 |
| POS538 |  | 10-1 | 2019-10-20<br>13: <b>48:30.0</b> | 36,57902 | 25,43641 |
| POS538 |  | 10-1 | 2019-10-20<br>15: <b>46:38.0</b> | 36,50092 | 25,53641 |
| POS538 |  | 10-1 | 2019-10-20<br>16: <b>14:07.0</b> | 36,49079 | 25,5243  |

|        |  |      |                                  |          |          |
|--------|--|------|----------------------------------|----------|----------|
| POS538 |  | 10-1 | 2019-10-20<br>18: <b>41:56.0</b> | 36,56991 | 25,42419 |
| POS538 |  | 10-1 | 2019-10-20<br>19: <b>10:33.0</b> | 36,57929 | 25,43696 |
| POS538 |  | 10-1 | 2019-10-20<br>21: <b>13:26.0</b> | 36,50099 | 25,5373  |
| POS538 |  | 10-1 | 2019-10-20<br>21: <b>41:02.0</b> | 36,49175 | 25,52499 |
| POS538 |  | 10-1 | 2019-10-21<br>00: <b>04:20.0</b> | 36,56981 | 25,42524 |
| POS538 |  | 10-1 | 2019-10-21<br>00: <b>43:34.0</b> | 36,71309 | -4,42198 |
| POS538 |  | 10-1 | 2019-10-21<br>02: <b>42:00.0</b> | 36,49648 | 25,53204 |
| POS538 |  | 10-1 | 2019-10-21<br>03: <b>10:38.0</b> | 36,48548 | 25,51883 |
| POS538 |  | 10-1 | 2019-10-21<br>05: <b>44:32.0</b> | 36,56157 | 25,41477 |
| POS538 |  | 10-1 | 2019-10-21<br>06: <b>11:10.0</b> | 36,57029 | 25,42609 |
| POS538 |  | 10-1 | 2019-10-21<br>08: <b>04:41.0</b> | 36,71309 | -4,42198 |
| POS538 |  | 10-1 | 2019-10-21<br>08: <b>41:06.0</b> | 36,4866  | 25,5197  |
| POS538 |  | 10-1 | 2019-10-21<br>11: <b>13:52.0</b> | 36,56288 | 25,4176  |
| POS538 |  | 10-1 | 2019-10-21<br>11: <b>59:36.0</b> | 36,56918 | 25,42286 |
| POS538 |  | 10-1 | 2019-10-21<br>13: <b>59:23.0</b> | 36,49197 | 25,52563 |
| POS538 |  | 10-1 | 2019-10-21<br>14: <b>49:31.0</b> | 36,48944 | 25,52255 |
| POS538 |  | 10-1 | 2019-10-21<br>17: <b>39:08.0</b> | 36,57458 | 25,43254 |
| POS538 |  | 10-1 | 2019-10-21<br>18: <b>25:56.0</b> | 36,5797  | 25,4376  |
| POS538 |  | 10-1 | 2019-10-21<br>20: <b>39:42.0</b> | 36,50102 | 25,5386  |
| POS538 |  | 10-1 | 2019-10-22<br>07: <b>29:14.0</b> | 36,56832 | 25,42885 |
| POS538 |  | 10-1 | 2019-10-22<br>09: <b>47:21.0</b> | 36,49233 | 25,52465 |
| POS538 |  | 10-1 | 2019-10-22<br>10: <b>47:38.0</b> | 36,49323 | 25,52523 |
| POS538 |  | 10-1 | 2019-10-22<br>12: <b>45:12.0</b> | 36,55664 | 25,44272 |
| POS538 |  | 10-1 | 2019-10-22<br><b>12:50:52.0</b>  | 36,55875 | 25,441   |
| POS538 |  | 10-1 | 2019-10-22<br><b>13:38:28.0</b>  | 36,57177 | 25,43574 |
| POS538 |  | 11-1 | 2019-10-23<br><b>08:16:54.0</b>  | 36,55036 | 25,50603 |

|        |  |      |                                  |          |          |
|--------|--|------|----------------------------------|----------|----------|
| POS538 |  | 11-1 | 2019-10-23<br>08:41: <b>32.0</b> | 36,52976 | 25,51108 |
| POS538 |  | 11-1 | 2019-10-23<br>09: <b>21:04.0</b> | 36,49179 | 25,52795 |
| POS538 |  | 11-1 | 2019-10-23<br>13: <b>35:43.0</b> | 36,23895 | 25,44601 |
| POS538 |  | 11-1 | 2019-10-23<br>14: <b>02:02.0</b> | 36,23901 | 25,44584 |
| POS538 |  | 11-1 | 2019-10-23<br>15: <b>19:18.0</b> | 36,26796 | 25,34932 |
| POS538 |  | 11-1 | 2019-10-23<br>15: <b>46:16.0</b> | 36,26796 | 25,3499  |
| POS538 |  | 11-1 | 2019-10-23<br>16: <b>56:51.0</b> | 36,33485 | 25,39939 |
| POS538 |  | 11-1 | 2019-10-23<br>17: <b>14:30.0</b> | 36,34003 | 25,38234 |
| POS538 |  | 11-1 | 2019-10-23<br>20: <b>43:46.0</b> | 36,14087 | 25,27406 |
| POS538 |  | 11-1 | 2019-10-23<br>21: <b>27:58.0</b> | 36,15707 | 25,30845 |
| POS538 |  | 11-1 | 2019-10-24<br>00: <b>49:07.0</b> | 36,34244 | 25,16866 |
| POS538 |  | 11-1 | 2019-10-24<br>01: <b>07:47.0</b> | 36,34137 | 25,15005 |
| POS538 |  | 11-1 | 2019-10-24<br>02: <b>24:11.0</b> | 36,27036 | 25,19765 |
| POS538 |  | 11-1 | 2019-10-24<br>02: <b>44:12.0</b> | 36,26007 | 25,18262 |
| POS538 |  | 11-1 | 2019-10-24<br>04: <b>03:07.0</b> | 36,33466 | 25,13663 |
| POS538 |  | 11-1 | 2019-10-24<br>05: <b>03:24.0</b> | 36,29816 | 25,10906 |
| POS538 |  | 11-1 | 2019-10-24<br>08: <b>21:46.0</b> | 36,37276 | 25,31622 |
| POS538 |  | 11-1 | 2019-10-24<br>08: <b>53:53.0</b> | 36,37187 | 25,31596 |
| POS538 |  | 11-1 | 2019-10-24<br>11: <b>45:18.0</b> | 36,19012 | 25,31759 |
| POS538 |  | 11-1 | 2019-10-24<br>12: <b>18:47.0</b> | 36,18953 | 25,31769 |
| POS538 |  | 11-1 | 2019-10-24<br>13: <b>50:10.0</b> | 36,2797  | 25,27115 |
| POS538 |  | 11-1 | 2019-10-24<br>15: <b>50:45.0</b> | 36,33146 | 25,24445 |
| POS538 |  | 11-1 | 2019-10-24<br><b>16:55:42.0</b>  | 36,45853 | 25,24958 |
| POS538 |  | 11-1 | 2019-10-24<br>19: <b>10:39.0</b> | 36,54932 | 25,39484 |
| POS538 |  | 11-1 | 2019-10-24<br>19: <b>11:11.0</b> | 36,54973 | 25,39528 |
| POS538 |  | 11-1 | 2019-10-25<br>00: <b>17:48.0</b> | 36,78479 | 25,60887 |

|        |  |      |                                  |          |          |
|--------|--|------|----------------------------------|----------|----------|
| POS538 |  | 11-1 | 2019-10-25<br>00: <b>44:30.0</b> | 36,78511 | 25,60948 |
| POS538 |  | 11-1 | 2019-10-25<br>04: <b>43:35.0</b> | 36,54905 | 25,7716  |
| POS538 |  | 11-1 | 2019-10-25<br>05: <b>20:27.0</b> | 36,54722 | 25,74878 |
| POS538 |  | 11-1 | 2019-10-25<br>07: <b>02:20.0</b> | 36,63386 | 25,80726 |
| POS538 |  | 11-1 | 2019-10-25<br>07: <b>02:40.0</b> | 36,63422 | 25,80717 |
| POS538 |  | 11-1 | 2019-10-25<br>09: <b>13:02.0</b> | 36,74664 | 25,71255 |
| POS538 |  | 11-1 | 2019-10-25<br>09: <b>47:15.0</b> | 36,7463  | 25,71319 |
| POS538 |  | 11-1 | 2019-10-25<br>12: <b>54:38.0</b> | 36,75455 | 25,95363 |
| POS538 |  | 11-1 | 2019-10-25<br>13: <b>48:28.0</b> | 36,71843 | 25,95322 |
| POS538 |  | 11-1 | 2019-10-25<br>15: <b>01:35.0</b> | 36,77811 | 25,90286 |
| POS538 |  | 11-1 | 2019-10-25<br>15: <b>40:31.0</b> | 36,77728 | 25,90249 |
| POS538 |  | 11-1 | 2019-10-25<br>16: <b>27:08.0</b> | 36,74648 | 25,85997 |
| POS538 |  | 11-1 | 2019-10-25<br>16: <b>27:28.0</b> | 36,74636 | 25,85961 |
| POS538 |  | 11-1 | 2019-10-25<br>16: <b>42:02.0</b> | 36,75042 | 25,85178 |
| POS538 |  | 12-1 | 2019-10-26<br>08:16: <b>23.0</b> | 36,58533 | 25,37802 |
| POS538 |  | 12-1 | 2019-10-26<br>08: <b>47:01.0</b> | 36,58496 | 25,39378 |
| POS538 |  | 12-1 | 2019-10-26<br>11: <b>32:07.0</b> | 36,49371 | 25,52901 |
| POS538 |  | 12-1 | 2019-10-26<br><b>11:36:19.0</b>  | 36,49138 | 25,53233 |
| POS538 |  | 13-1 | 2019-10-26<br><b>12:03:56.0</b>  | 36,50274 | 25,50197 |
| POS538 |  | 13-1 | 2019-10-26<br><b>12:07:25.0</b>  | 36,50234 | 25,50268 |
| POS538 |  | 13-1 | 2019-10-26<br>12: <b>15:32.0</b> | 36,50692 | 25,50325 |
| POS538 |  | 14-1 | 2019-10-26<br><b>12:31:52.0</b>  | 36,52109 | 25,48822 |
| POS538 |  | 14-1 | 2019-10-26<br><b>12:37:42.0</b>  | 36,52037 | 25,48824 |
| POS538 |  | 14-1 | 2019-10-26<br>12: <b>43:08.0</b> | 36,52292 | 25,48657 |
| POS538 |  | 15-1 | 2019-10-26<br><b>13:03:02.0</b>  | 36,5337  | 25,45617 |
| POS538 |  | 15-1 | 2019-10-26<br><b>13:16:43.0</b>  | 36,53312 | 25,45731 |

|        |  |      |                                  |          |          |
|--------|--|------|----------------------------------|----------|----------|
| POS538 |  | 15-1 | 2019-10-26<br>13: <b>22:00.0</b> | 36,53493 | 25,4546  |
| POS538 |  | 16-1 | 2019-10-26<br><b>13:36:47.0</b>  | 36,5447  | 25,4729  |
| POS538 |  | 16-1 | 2019-10-26<br><b>13:41:02.0</b>  | 36,54472 | 25,4733  |
| POS538 |  | 16-1 | 2019-10-26<br>13: <b>45:41.0</b> | 36,54637 | 25,47122 |
| POS538 |  | 17-1 | 2019-10-26<br><b>14:04:39.0</b>  | 36,55244 | 25,43953 |
| POS538 |  | 17-1 | 2019-10-26<br><b>14:09:25.0</b>  | 36,55243 | 25,43968 |
| POS538 |  | 17-1 | 2019-10-26<br>14: <b>15:30.0</b> | 36,55508 | 25,43877 |
| POS538 |  | 18-1 | 2019-10-26<br><b>14:34:56.0</b>  | 36,57039 | 25,40844 |
| POS538 |  | 18-1 | 2019-10-26<br><b>14:40:05.0</b>  | 36,57031 | 25,40861 |
| POS538 |  | 18-1 | 2019-10-26<br>14: <b>49:31.0</b> | 36,5721  | 25,40814 |
| POS538 |  | 19-1 | 2019-10-26<br>15:04: <b>53.0</b> | 36,57411 | 25,40567 |
| POS538 |  | 19-1 | 2019-10-26<br>15:14:42.0         | 36,57436 | 25,40468 |
| POS538 |  | 19-1 | 2019-10-26<br>15: <b>23:40.0</b> | 36,57367 | 25,40453 |
| POS538 |  | 20-1 | 2019-10-27<br><b>06:15:19.0</b>  | 36,44175 | 25,52842 |
| POS538 |  | 20-1 | 2019-10-27<br>06:27: <b>33.0</b> | 36,43104 | 25,53584 |
| POS538 |  | 20-1 | 2019-10-27<br>06: <b>33:06.0</b> | 36,42635 | 25,53976 |
| POS538 |  | 20-1 | 2019-10-27<br>08: <b>53:13.0</b> | 36,331   | 25,66808 |
| POS538 |  | 20-1 | 2019-10-27<br>09: <b>24:07.0</b> | 36,33173 | 25,66762 |
| POS538 |  | 20-1 | 2019-10-27<br>11: <b>38:13.0</b> | 36,45929 | 25,67507 |
| POS538 |  | 20-1 | 2019-10-27<br>11: <b>38:24.0</b> | 36,45944 | 25,67521 |
| POS538 |  | 20-1 | 2019-10-27<br>12: <b>36:48.0</b> | 36,48352 | 25,73123 |
| POS538 |  | 20-1 | 2019-10-27<br>12: <b>36:52.0</b> | 36,48352 | 25,73132 |
| POS538 |  | 20-1 | 2019-10-27<br>14: <b>12:25.0</b> | 36,40431 | 25,798   |
| POS538 |  | 20-1 | 2019-10-27<br>14: <b>57:09.0</b> | 36,42179 | 25,83035 |
| POS538 |  | 20-1 | 2019-10-27<br>15: <b>46:20.0</b> | 36,46136 | 25,79967 |
| POS538 |  | 20-1 | 2019-10-27<br>15: <b>50:13.0</b> | 36,46293 | 25,79829 |
| POS538 |  | 20-1 | 2019-10-27                       | 36,46586 | 25,79586 |

|  |  |  |                    |  |  |
|--|--|--|--------------------|--|--|
|  |  |  | 15: <b>56:53.0</b> |  |  |
|--|--|--|--------------------|--|--|